

A light blue map of East Asia, including Japan, Korea, and parts of China, serves as the background for the slide. The text is overlaid on this map.

J-PARC status and EPICS Collaboration Meeting in China

Noboru Yamamoto

KEK, JAPAN

**At EPICS Collaboration meeting
in Santa Fe, May 5, 2004**

J-PARC

- Status in Apr.2004-



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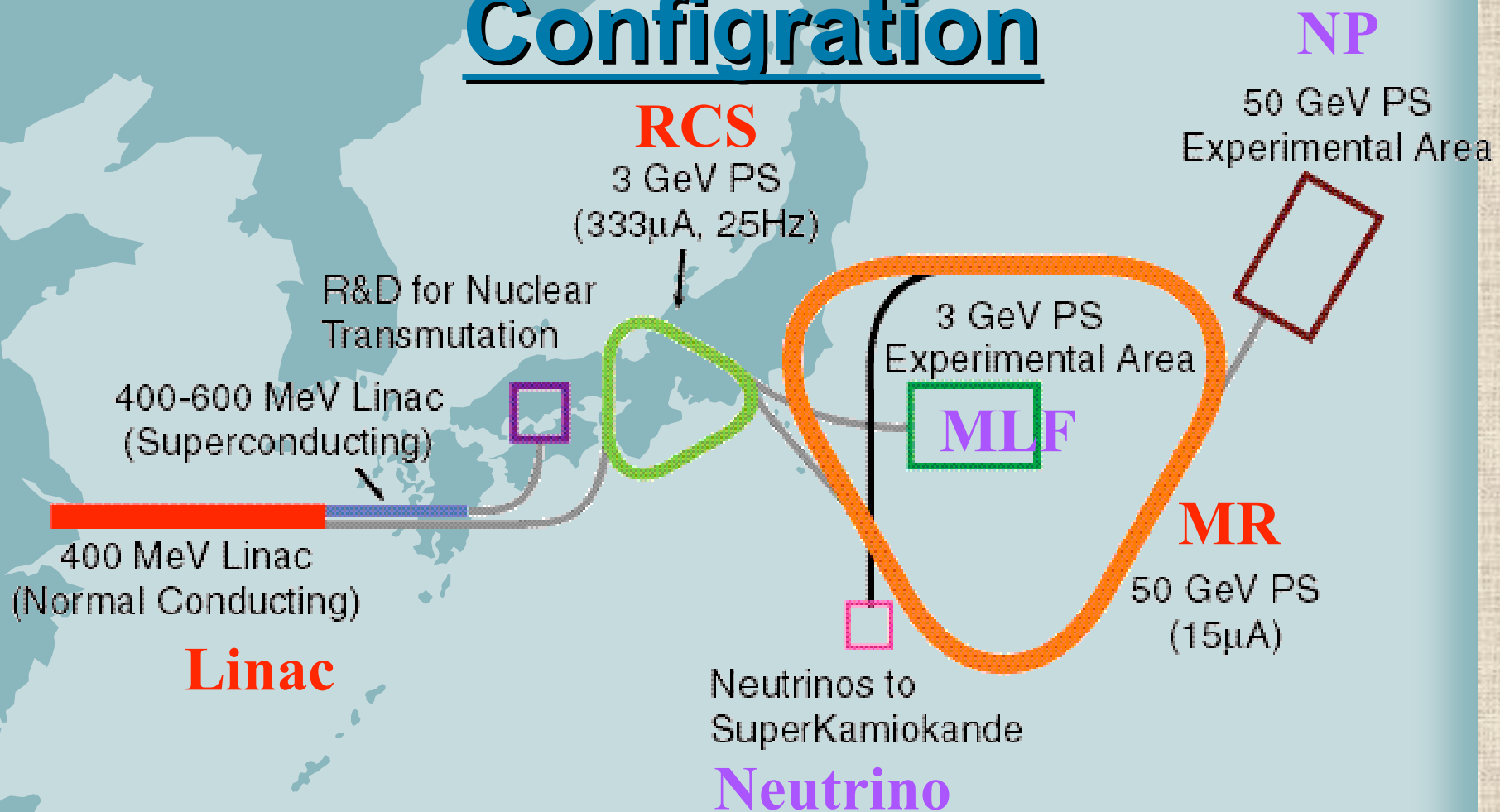
J-PARC Control Group

EPICS Traversal Group at KEK

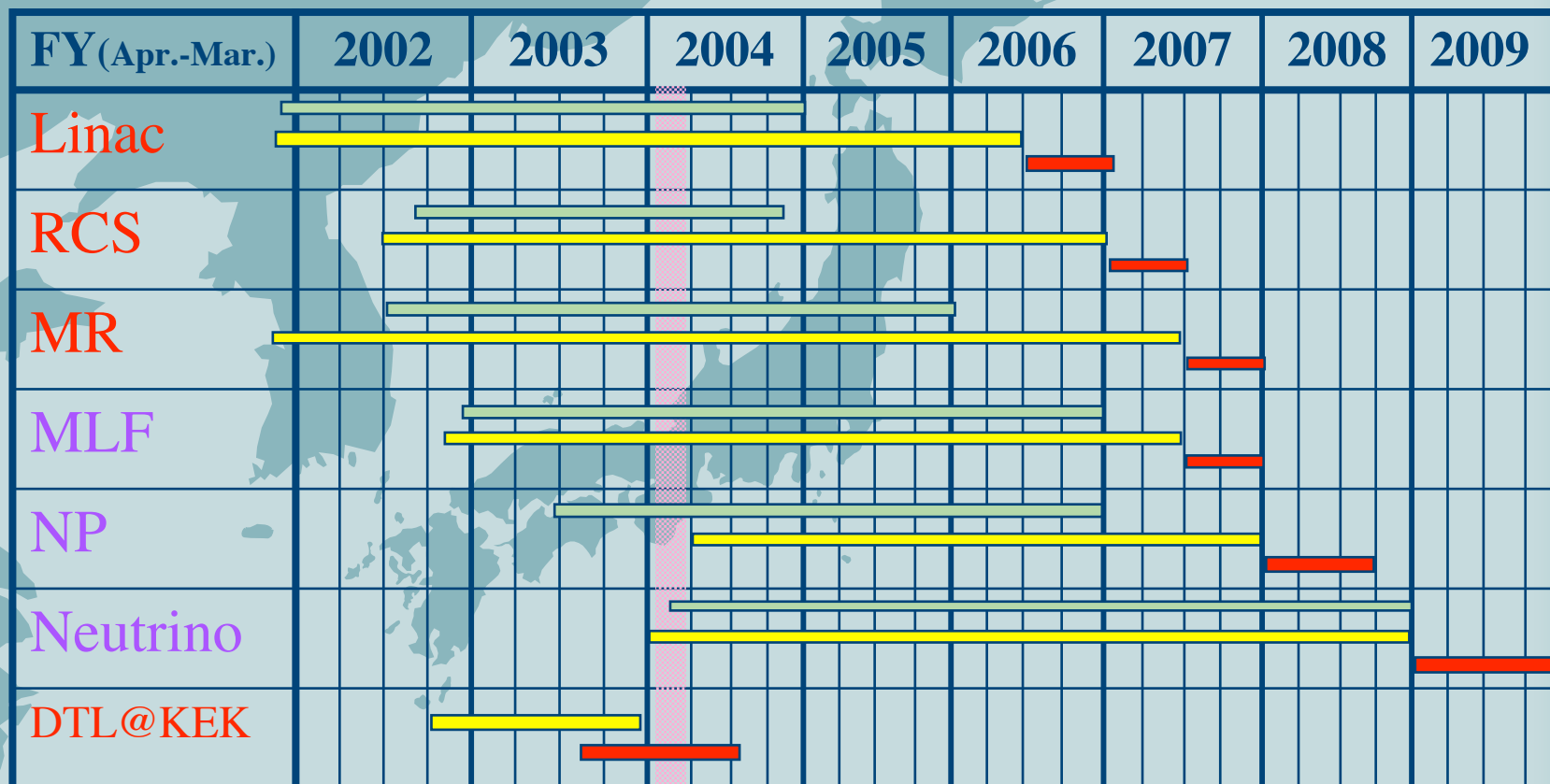
J-PARC

- Japan Proton Accelerator Research Complex
- A joint project between JAERI and KEK
Under construction in JAERI-Tokai
 - # Tokai is 60km NE of KEK-Tsukuba
 - # Tokai is 130km NE of Tokyo
 - # JAERI – Japan Atomic Energy Research Institute

Accelerator Facility - Configuration



Schedule



Building Construction

Hardware Production & Installation

Beam Tests

Accelerator Status #1

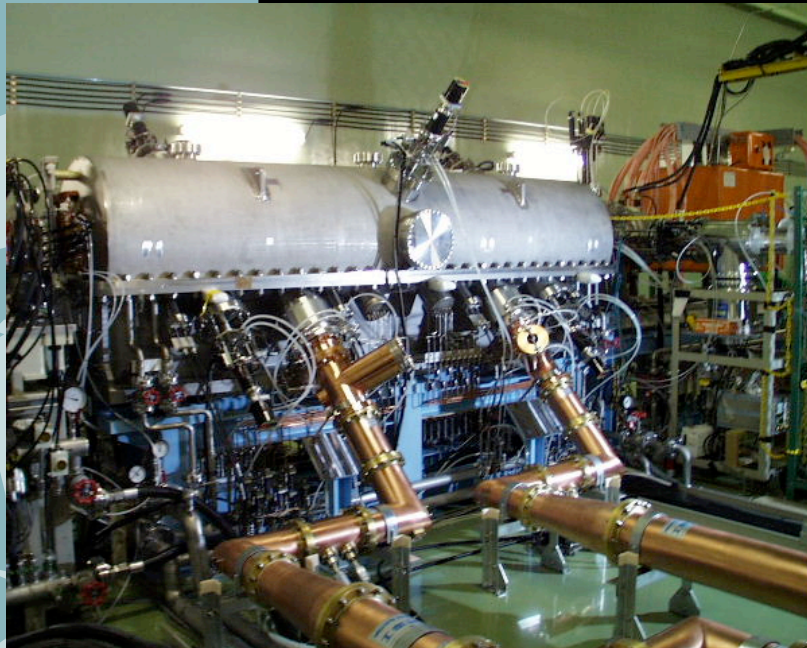
(from <http://j-parc.jp>)



Buildings Constructions at JAERI-Tokai : RCS (Apr.2004)

EPICS Collaboration Meeting in Santa Fe, May 2004 by N.Kanikusota@KEK

Accelerator Status #2

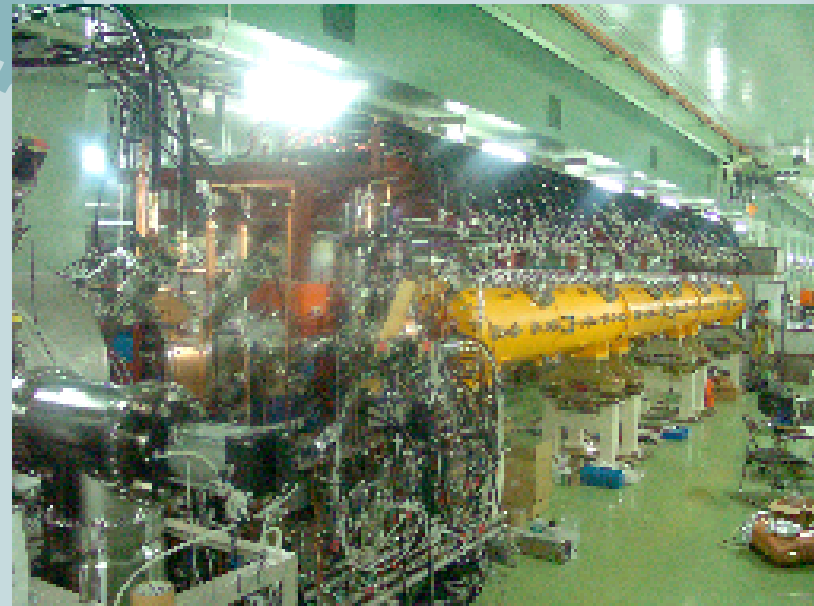


RFQ and the part of
Ion Source

(photo by Y.Kondo)

“60MeV linac” (up to DTL)
at KEK-Tsukuba

(will be moved to Tokai in 2005)



DTL section

Accelerator Status #3



Ancient remains (15-17C) found
at the MR site

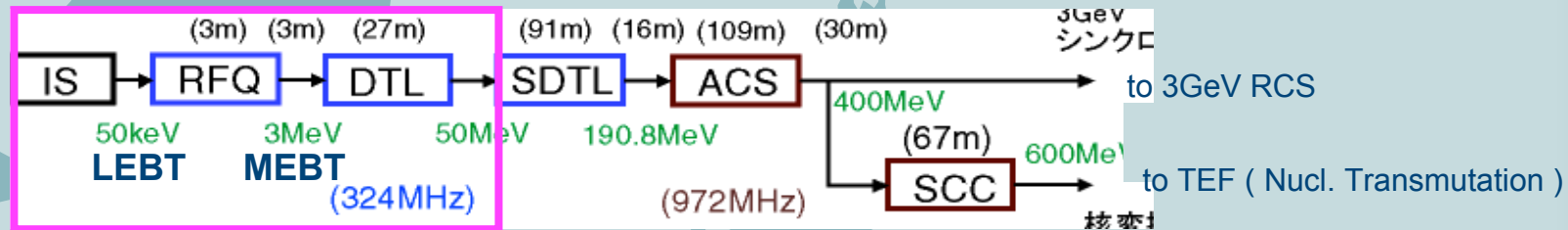
Construction delays _-1 year

(more in <http://www.ibaraki-maibun.org/04shuzo/h15-iseki/04tokai/0304tokai.htm>)



The KEK 60MeV Linac

Figure from <http://j-parc.jp/Acc/linac/japanese/linacindexj.html>



The “60MeV Linac”

Constructed at KEK, will move to JAERI in 2005

Enable beam studies in early phase of the project

Beam commissioning

MEBT commissioning in Apr-Jul.02 & in Jan-Feb.03

DTL commissioning in Oct-Nov.2003 & Feb-Sep.2004

The KEK 60MeV Linac (continued)

- **DTL commissioning**
 - Oct.-Nov.2003, Feb.2004- (stop in Sep.2004)
 - Beam acceleration to the design values by the 1st DTL tank succeeded (Nov.2003)
 - Acceleration to **19.7MeV, 30mA**, was achieved
 - <http://www.jaeri.go.jp/english/press/2003/031113/>
 - <http://www.kek.jp/press/2003/j-parc.html>
 - **Recent weekly schedule**
 - (Mon) schedule meeting
 - (Thu) studies with beam

Prototype Control System at KEK

- **Test EPICS with a real accelerator**
 - Test newly developed interfaces/devices
 - netDevDriver for PLC/EMB-LAN, WE7000, etc.
- **Training of EPICS**
 - for both control and non-control staff
- **Contribute to the 60MeV commissioning**
 - Remote monitoring and control
 - **Migration** of small stand-alone control systems to an EPICS-based control system

Prototype Control System (continued)

- **Computers**

- IOC – VME (5 for develop. + 5 for operation)
 - PowerPC board (Force and Advanet) + VxWorks 5.4
- One HP-UX 11.0 server machine
 - main development, file service (nfs) , nis server, etc.
- Network-based interfaces

- **Software Environment**

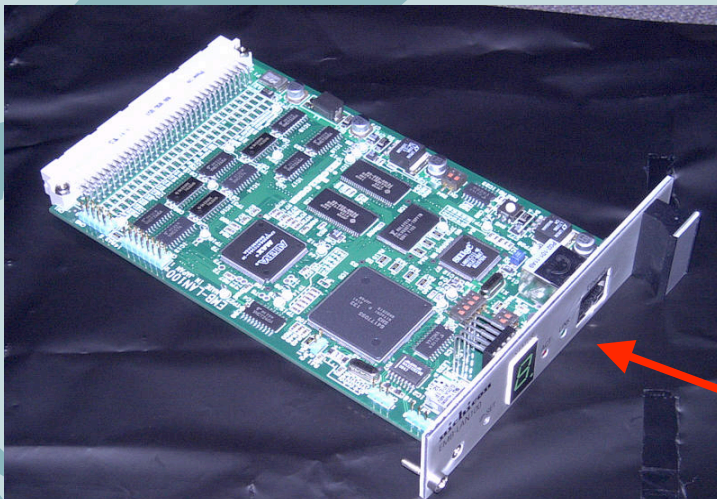
- EPICS 3.13.6 (trying to move to 3.14.4)
- netDevDriver and WE7111(Oscilloscope module)
- Channel Archiver 1.9 (moving to 2.1.1)
- SAD and Python

Network-based interfaces

- **PLC**
 - **FA-M3 by Yokogawa** widely used
 - For Ion source, timing, RF, vacuum, ..
- **EMB-LAN**
 - Developed as an embedded controller for magnet power-supplies
 - For MEBT steering (6), DTL-Q pulsed (77)
- **WE7000**
 - Commercial product by Yokogawa
 - **WE7111 (100MS Osc)** for beam monitors

Network-based interfaces (EMB-LAN)

Power-supply for a
MEBT steering
magnet



EMB-LAN (100Mbps)

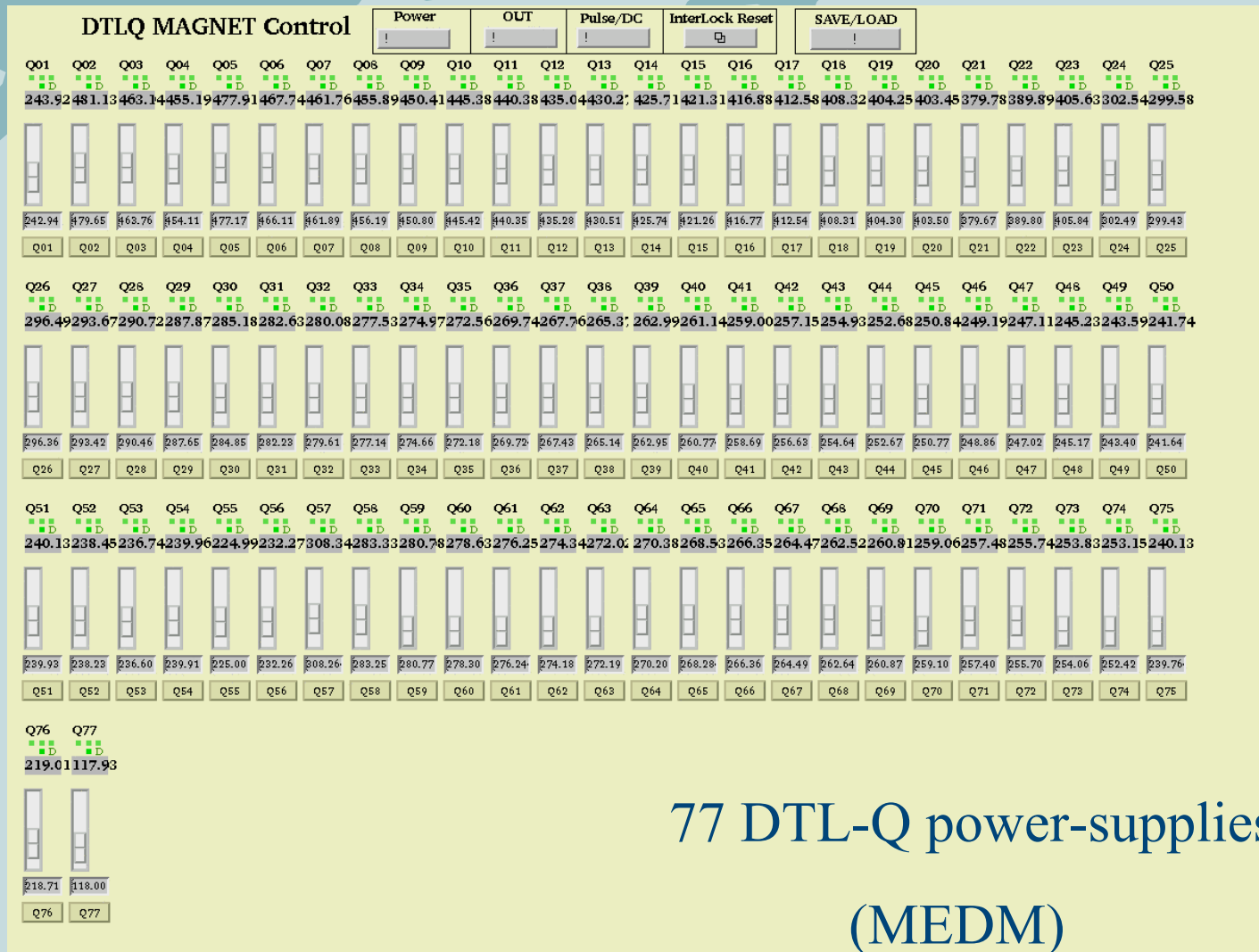
16bit input, 16bit output

256w in/out register

Ethernet connection to IOC



Network-based interfaces (EMB-LAN)



Network-based interfaces (WE7000)

WE7000 station

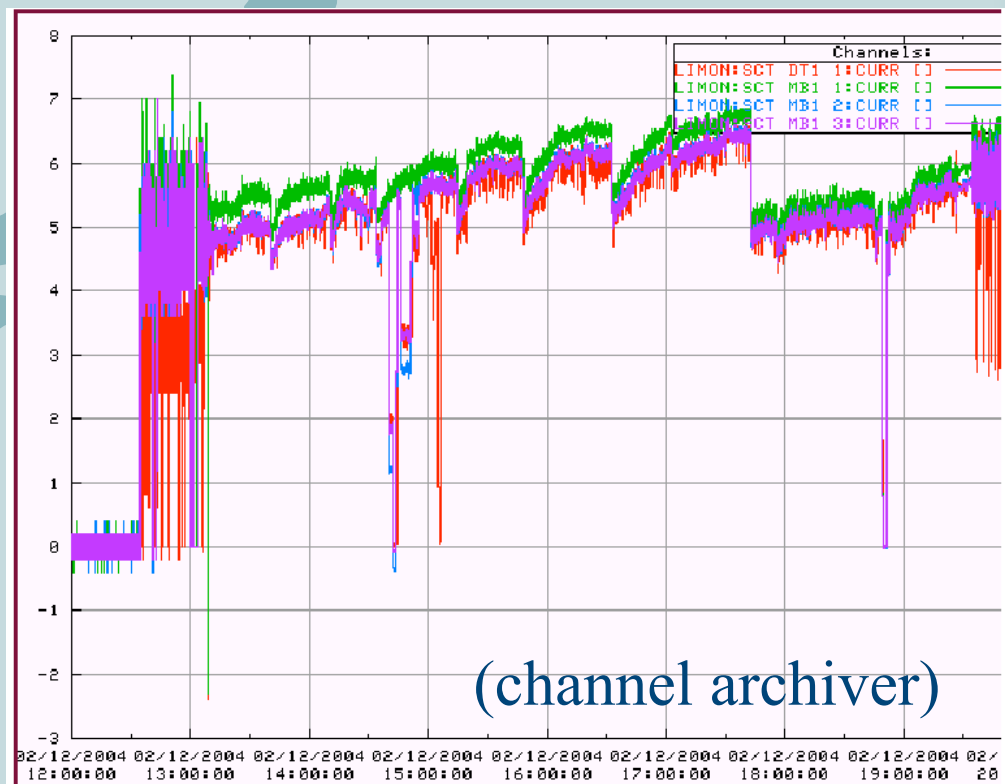
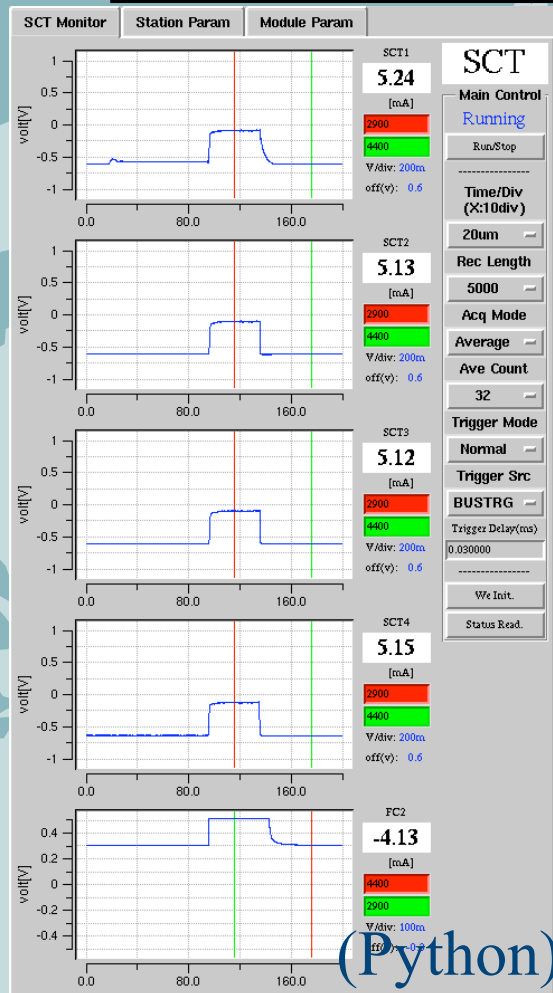
Ethernet module
(WE7052)

100MS/s oscilloscope
(WE7111)



Network-based interfaces (WE7000)

5 SCT beam-monitors



Do more in the 60MeV control

- **Add missing records at the 60MeV linac**
 - Vacuum
 - Safety (beam switch / beam mode)
 - Utilities (cooling water etc.)
- **Beam studies by SAD**
 - Add more CPU power
 - (soon) Introduce Linux server machines
 - Encourage non-control staffs to develop software
- **Monitor - DAQ rate of WE is not high enough**
 - **3-5Hz achieved** with WE7111 oscilloscopes
 - More studies at KEK to improve DAQ rate

Stand-alone IOC (New in Apr.04)



OpenBlockS266 - a commercial Linux-Box

- PPC 266MHz, 64MB memory, 3inch disk (or Flash), Linux 2.4.20
- <http://online.plathome.co.jp/products/openblocks/openblocks266/>
- EPICS 3.14.4 + NetworkDriver (by JAERI)
- Basic communication with an Agilent oscilloscope succeeded (get a waveform-height)

EPICS Collaboration Meeting in Santa Fe, May 2004 by N.Kamikubota@KEK

Conclusion

- J-PARC accelerators
 - Under construction at JAERI-Tokai
 - Construct buildings; start beam delivery in 2007
 - The 60MeV linac is in commissioning at KEK-Tsukuba
 - Beam acceleration with a DTL tank succeeded
 - Move to Tokai in 2005
- Prototype Control system for the 60MeV linac
 - Developing+Evaluating an E P I C S -based prototype
 - Network devices (PLC/EMB-LAN + netDevDriver, WE7000)
 - Providing hints and feedbacks to the future JAERI-Tokai control system